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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/774,653	02/04/2004	David A. Cylinder	95,938	1077

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EXAMINER

COLLINS, TIMOTHY D

ART UNIT PAPER NUMBER

3643

DATE MAILED: 05/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/774,653

Applicant(s)

CYLINDER, DAVID A.

Examiner

Timothy D Collins

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 February 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 22-27, 29-31, 33 and 35-42 is/are allowed.
- 6) ☒ Claim(s) 1-7, 10-19, 21, 28, 32 and 34 is/are rejected.
- 7) ☒ Claim(s) 8, 9 and 20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 May 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/4/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

D

1-10

DETAILED ACTION

Information Disclosure Statement

Note: the 5th citation in the 2nd page of the IDS has not been initialed because it appears to be a copy of the 2nd reference citation.

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "mechanical stops" of claims 14 and 35 and also the "battens" of claims 13 and 34 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner,

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the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to under 37 CFR 1.83(a) because they fail to show numbers 174 and 176 which are the motor and the gear mechanisms as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application.

Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The incorporation of essential material in the specification by reference to an unpublished U.S. application, foreign application or patent, or to a publication is improper. Applicant is required to amend the disclosure to include the material incorporated by reference, if the material is relied upon to overcome any objection, rejection, or other requirement imposed by the Office. The amendment must be accompanied by a statement executed by the applicant, or a practitioner representing the applicant, stating that the material being inserted is the material previously incorporated by reference and that the amendment contains no new matter. 37 CFR 1.57(f). Note: There are many instances in the current application of an attempt to incorporate publications by reference into the application. These instances must be corrected.

4. The disclosure is objected to because of the following informalities: the rudder number 190 is referred to as number 180 in line 5 of page 7. Previously the rudder had been referred to as 190, therefore it is suggested that the applicant change the number 180 to a 190. Also the "battens" of page 5 at line 7 are referred to by number 120 which is also used to refer to the leading edge. These must be renumbered so as to match the spec, drawings, and claims.

Appropriate correction is required.

Claim Objections

5. Claim 22 is objected to because of the following informalities: in line 4, the phrase "wing being" should be "wings being". Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 7, 11, 13, 15, 28, 32 and 34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. Claim 7 recites the limitation "the beams" in line 1. There is insufficient antecedent basis for this limitation in the claim. Because "a beam" has not been positively claimed previously. It appears that the applicant intended to have the claim depend from claim 6, which refers to two beams. Therefore the examiner takes claim 7 to depend from 6 for the purpose of examination on the merits.

9. Claim 28 recites the limitation "the beams" in line 1. There is insufficient antecedent basis for this limitation in the claim. Because "a beam" has not been positively claimed previously. It appears that the applicant intended to have the claim depend from claim 27, which refers to two beams. Therefore the examiner takes claim 28 to depend from 6 for the purpose of examination on the merits.

10. Claims 13 and 34 recite the structure of a "batten". This structure is not shown in the figures and is not described in the specification such that it is clear where the structure must be and also what it is and what function it performs. Therefore the structure is taken as being any structure which allows the wings to beat at more than 10hz.

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11. Claim 11 recites in lines 3 and 4 "one of the beams is connected to the leading edge of one of the forward pair of wings", this implies that there are multiple forward pairs of wings. It is unclear if applicant actually wishes to claim multiple forward pairs of wings or not, because only one forward and one rearward pair of wings was claimed previously. It is suggested that the applicant change the wording to state "one of the beams is connected to the leading edge of one of the wings of the forward pair of wings". Similarly the claim also recites in lines 5 and 6 "the other of the beams is connected to a leading edge of another of the forward pair of wings". This is also unclear because it implies multiple pairs as well similarly to the first section of claim 11. It is suggested that the applicant change the wording to state "the other of the beams is connected to the leading edge of one of the other wing of the forward pair of wings". For the purposes of examination on the merits it is taken that this is what the applicant intends and therefore the claim has been treated with the above taken into account.

12. Claim 15 recites in line 3 "on one of the forward pair of wings", this implies that there are multiple forward pairs of wings. It is unclear if applicant actually wishes to claim multiple forward pairs of wings or not, because only one forward and one rearward pair of wings was claimed previously. It is suggested that the applicant change the wording to state "on one of the wings of the forward pair of wings". Similarly the claim also recites in line 4 "another of the forward pair of wings". This is also unclear because it implies multiple pairs as well similarly to the first section of claim 15. It is suggested that the applicant change the

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wording to state "the other wing of the forward pair of wings". For the purposes of examination on the merits it is taken that this is what the applicant intends and therefore the claim has been treated with the above taken into account.

13. Claim 32 recites in lines 3 and 4 "one of the beams is connected to the leading edge of one of the forward pair of wings", this implies that there are multiple forward pairs of wings. It is unclear if applicant actually wishes to claim multiple forward pairs of wings or not, because only one forward and one rearward pair of wings was claimed previously. It is suggested that the applicant change the wording to state "one of the beams is connected to the leading edge of one of the wings of the forward pair of wings". Similarly the claim also recites in lines 5 and 6 "the other of the beams is connected to a leading edge of another of the forward pair of wings". This is also unclear because it implies multiple pairs as well similarly to the first section of claim 11. It is suggested that the applicant change the wording to state "the other of the beams is connected to the leading edge of one of the other wing of the forward pair of wings". For the purposes of examination on the merits it is taken that this is what the applicant intends and therefore the claim has been treated with the above taken into account.

Claim Rejections - 35 USC § 102

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

15. Claims 1,4,5,10,13,14,17 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by a naturally occurring dragonfly hereinafter called "df". For examples of a dragonfly see

<http://www.detnews.com/pix/2004/02/12/metro/m012-dragon-0204n-4.jpg>.

a. Re claim 1, df discloses a vehicle for moving through a fluid (the dragonfly is a vehicle for other insects and parasites such as mites), with a forward portion (portion towards the head) and a rearward portion (portion towards the tail). Also the df has a first pair of wings (the front ones) and a second pair of wings (the aft ones), and a body connected to the wing pairs which drives the pairs toward each other and away from one another. For example the front ones sweep downward while the rear ones sweep upward. In this case the front ones go toward one another when they go down and the rear ones go toward one another when they go down.

b. Re claim 4, the examiner takes official notice that df discloses that the wings comprise a flexible sheet in that the wings change camber during the stroke. This can be seen to some degree in the example photo and also in <http://www.rvc.ac.uk/Research/PDFs/JW05.pdf>.

c. Re claim 5, the examiner takes official notice that df wings have a camber during an upstroke that is opposite the camber during a down

stroke. This can be seen at least in "Dragonfly Flight" which can be seen at <http://www.rvc.ac.uk/Research/PDFs/JW05.pdf>.

d. Re claim 10, df discloses that each of the wings has a leading edge which is connected to the body, in that the wings have a leading edge structure which ends at the body.

e. Re claim 13, df discloses that at least one of the wings includes a flexible sheet (the wings are like cellophane and change camber during the stroke) and a stiff leading edge (support structure runs along the leading edge of the df wings) and a batten (as stated in the 112 rejection above, this is taken to be inherently included because the df wings flap at greater than 10hz. The examiner takes official notice of such and points to naturally occurring dragonfly wings and bodies.

f. Re claim 14, df also discloses inherently a mechanical stop because the wings can only move to some maximum extent and then must stop. Therefore it is inherent that there must be some "stop" which controls the movement. The stop may be as simple as the hinges are only able to move to a maximum, just as human arms only move so far due to hinge and muscle constraints.

g. Re claim 17, df also discloses a rudder "for controlling vehicle direction" in the tail. The tail may be used to control to some extent even if it is small the df direction.

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h. Re claim 19, the examiner takes official notice that dragonfly wings flap with the front wings traveling up while the rear wings travel down. They maintain this opposite wing flapping during flight.

i. NOTE: The examiner has studied the dragonfly with respect to an aerospace engineering class entitled "Fluid Flows in Nature" at Virginia Tech. The dragonfly is an insect which is well known for having very interesting flight characteristics and which exhibits low Reynolds number flight.

16. Claims 1,2,4,6,10 and 14-18 are rejected under 35 U.S.C. 102(b) as being anticipated by USPN 6206324 to Smith (hereinafter called 324).

j. Re claim 1, 324 discloses a vehicle for moving through a fluid (as seen in figure 6 at least) with a forward (section toward the number 600) and rearward portion (section toward the opposite end from 600). 324 also has a first pair of wings at the forward portion (wings 610 and 612 are the pair) and a second pair at the rearward portion (at least as seen in numbers 613 and 611). 324 also discloses a body 600 arranged to drive the forward wings toward and away from one another (down is toward one another and up is away from one another), also the rearward wings are driven in a similar manner.

k. Re claims 2 and 3, 324 discloses that the vehicle has a power source which is a battery as seen at least in column 8 at lines 61-62.

l. Re claim 4, 324 discloses inherently that the wings comprise a "flexible" sheet in that any material is inherently flexible to some extent

even if it is very small. It is suggested that the applicant claim some details which show the extent of the flexibility of the material.

m. Re claim 6, 324 discloses that the body includes at least two beams pivotally connected to each other at a central portion of the beams as seen at least in figure 1. The beams are the curved sections 110 and 120. These beams are connected at the pivot point which goes through both and is attached to the wing 101.

n. Re claim 10, 324 discloses that each of the wings has a leading edge (forward edge of the wings structures, toward the number 600) which is pivotally connected to the body (through the pivot point of the structure shown in figure 1). This is taken as the leading edge may not be directly connected to the pivot point or that the longitudinal axis of the leading edge is directly connected to the pivot point, but it is connected through the structure of the wing. It is suggested that the applicant claim some further defining structure or use terms such as "directly" connected. Also terms such as those of the claims 8 and 9, "connected to the body at the leading edge" are also suggested. Language which conveys some direction as to how the connection is made and where it is connected.

o. Re claim 14, 324 discloses inherently that there is a mechanical stop arranged to limit a range of motion of the wing in that the wing guides 110 and 120 have ends past which the wing cannot flap. These ends are the stops.

p. Re claim 15, 324 discloses a first boom (in this series of dependency number 110 from figure 1, but in the mechanism which drives wing 612 from figure 6) connected to a forward portion of the structure (forward portion of the craft, for one (wing 612) of the forward pair of wings) which limits the range of motion of the wing. Also 324 discloses a second boom (the same one from figure 1, but for the wing on the other side (wing 610 from figure 6)) which limits range of motion of the wing. These "booms" limit range of motion because they have a stop at the end, in that they are a track that ends. Also these are booms because they are a long supporting arm as defined by Meriam Webster's Collegiate Dictionary Tenth edition.

q. Re claim 16, 324 discloses a receiver adapted to receive radio control signals for controlling at least one of vehicle speed and direction. This is seen in that the ATSS of column 17 lines 1-5 and 30-36 may be located on the vehicle and it is made to receive velocity and position control from the radio controller of lines 34-35.

r. Re claim 17, 324 discloses that the vehicle may also include a rudder as seen in column 18 line 66 to column 19 line 7.

s. Re claims 18 and 19, 324 discloses that the wings are able to be completely independently controlled as seen at least in column 18 at lines 5-55. This means that the wings are capable of beating with the forward and rearward pairs all moving together and then apart, or that they may

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beat with the forward pair going together and then thereafter the rear pair going together.

Claim Rejections - 35 USC § 103

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over 324 as seen above in claims 1,2,4,6,10 and 14-18 in view of "df" as seen above in claims 1,4,5,10,13,14,17 and 19.

t. Re claim 5, 324 may not specifically disclose that the wings have opposite camber during an upstroke as they have during a down stroke, however the examiner takes official notice that the "df" reference exhibits this behavior. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have applied the teachings of changing camber into the device of 324 so as to increase efficiency of the wings during flight as taught by 324 in column 17 at lines 41-61 where it is disclosed that the purpose of the device is to fly similarly to a dragonfly.

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19. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over 324 as seen above in claims 1,2,4,6,10 and 14-18 in view of "Dragonfly Flight" by Wakeling and Ellington (hereinafter called "bioflight").

u. Re claim 21, 324 may not specifically disclose that at least one of the forward and rearward pair of wings contact each other during flight, however bioflight does teach of this at least on page 581 in the first column under the heading "Wing Interactions". It is seen from bioflight that the it is advantageous to employ a "clap and fling" mechanism in flight. Therefore it would have been to one of ordinary skill in the art at the time the invention was made to have applied the teachings of "clap and fling" into the device of 324 so as to enhance lift and produce greater thrust as seen in bioflight at the end of the section under "Wing Interactions".

Allowable Subject Matter

20. Claims 22-27,29-31,33 and 35-42 are allowed.

21. Claims 8,9 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

22. Claims 7,11 and 32 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

23. The following is a statement of reasons for the indication of allowable subject matter:

- v. Re claims 22-27,29-31,33 and 35-42, the prior art of record all failed to show either alone and/or in combination a vehicle with a first and second pair of wings. The first and second pairs of wings being connected to the structural members at the midspan of each wing.
- w. Re claim 8 the prior art of record all failed to show either alone and/or in combination: each wing having a leading edge connected at the central portion to the body of the craft.
- x. Re claim 9 the prior art of record all failed to show either alone and/or in combination: the wings having a wingspan that is pivotally connected at the midpoint to the body.
- y. Re claim 20 the prior art of record all failed to show either alone and/or in combination: at least one of the wings having independently movable surfaces at opposite lateral sides of the vehicle.
- z. Re claim 7, the prior art of record all failed to show either alone and/or in combination: the beams being connected at a central portion and driving the pairs of wings by the motion of the beams away from one another and toward one another.
- aa. Re claims 11 and 32, the prior art of record all failed to show either alone and/or in combination: the beams being connected to the wings at the leading edge of the wings.

Conclusion

24. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following disclose information about dragonflies and other animals.

bb. http://www.turtletrack.org/Issues04/Co03202004/Art/dragonfly_Cb.i

pg

cc. <http://wings.avkids.com/Book/Animals/instructor/insects-02.html>

dd. <http://orion.animaltracks.net/wingc.html>

ee. BITE-Wing,

[http://techtransfer.nrl.navy.mil/exhibits/pdfs/Info%20Sheet%20pdfs/UAV%](http://techtransfer.nrl.navy.mil/exhibits/pdfs/Info%20Sheet%20pdfs/UAV%20Info%20Sheets/BITE-Wing.pdf)

[20Info%20Sheets/BITE-Wing.pdf](http://techtransfer.nrl.navy.mil/exhibits/pdfs/Info%20Sheet%20pdfs/UAV%20Info%20Sheets/BITE-Wing.pdf), this appears to be the applicant's

invention, which the applicant's representative has stated was made

available on July 29, 2004.

ff. <http://www.rvc.ac.uk/Research/PDFs/JW05.pdf>

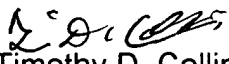
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy D Collins whose telephone number is 571-272-6886. The examiner can normally be reached on M-F, 7:00-3:00, with every other Fri. off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter M Poon can be reached on 571-272-6891. The fax

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phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Timothy D. Collins
Patent Examiner
Art Unit 3643